

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/FI2004/000679

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C07K14/465 C07K14/36 C12N15/62 C12N5/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 C07K C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| X          | US 6 492 492 B1 (STAYTON PATRICK S)<br>10 December 2002 (2002-12-10)<br>cited in the application<br>the whole document  | 1-4, 15,<br>16, 22-25 |
| X          | CHU V. ET AL: "Thermodynamic and<br>structural consequences of flexible loop<br>deletion by circular permutation in the<br>streptavidin-biotin system"<br>PROTEIN SCIENCE,<br>vol. 7, no. 4, April 1998 (1998-04), pages<br>848-859, XP002316238<br>ISSN: 0961-8368<br>cited in the application<br>the whole document | 1-4, 15,<br>16, 22-25 |

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the International filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the International filing date but later than the priority date claimed

- \*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \*G\* document member of the same patent family

Date of the actual completion of the International search

3 February 2005

Date of mailing of the International search report

21/02/2005

Name and mailing address of the ISA  
European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel (+31-70) 340-2040. Tx. 31 651 epo nl  
Fax: (+31-70) 340-3016

Authorized officer

Kools, P

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |  |                       |
|--|--|-----------------------|
| Category *   | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
| A  | <p>LAITINEN OLLI H ET AL: "Rational design of an active avidin monomer."<br/>JOURNAL OF BIOLOGICAL CHEMISTRY,<br/>vol. 278, no. 6,<br/>7 February 2003 (2003-02-07), pages<br/>4010-4014, XP002316239<br/>ISSN: 0021-9258<br/>the whole document</p>   | 9-11                  |
| A  | <p>NORDLUND H R ET AL: "Enhancing the thermal stability of avidin"<br/>JOURNAL OF BIOLOGICAL CHEMISTRY, AMERICAN SOCIETY OF BIOLOGICAL CHEMISTS, BALTIMORE, MD, US,<br/>vol. 278, no. 4,<br/>24 January 2003 (2003-01-24), pages<br/>2479-2483, XP002973647<br/>ISSN: 0021-9258<br/>the whole document</p>           | 9-11                  |
| A  | <p>LAITINEN OLLI H ET AL: "Chicken avidin-related proteins show altered biotin-binding and physico-chemical properties as compared with avidin"<br/>BIOCHEMICAL JOURNAL, PORTLAND PRESS, LONDON, GB,<br/>vol. 363, 2002, pages 609-617, XP002973648<br/>ISSN: 0264-6021<br/>the whole document</p>                   | 1-25                  |
| P,X  | <p>NORDLUND HENRI R ET AL: "Construction of a dual chain pseudotetrameric chicken avidin by combining two circularly permuted avidins"<br/>JOURNAL OF BIOLOGICAL CHEMISTRY,<br/>vol. 279, no. 35,<br/>27 August 2004 (2004-08-27), pages<br/>36715-36719, XP002316240<br/>ISSN: 0021-9258<br/>the whole document</p> | 1-25                  |

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/F12004/000679

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4, 15, 16, 22-25 (all partial)

Circular permuted avidin monomers, isolated polynucleotides encoding said monomers, recombinant vectors comprising said polynucleotides and host cells comprising said vectors. Method of producing the monomers.  
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2. claims: 1-4, 8-10, 15, 16, 22-25 all partial, and claim 5 complete

Circular permuted avidin monomer being cpAvd5to4, isolated polynucleotides encoding said monomer, recombinant vectors comprising said polynucleotide and host cells comprising said vectors. Method of producing the monomer.  
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3. claims: 1-4, 8-10, 15, 16, 22-25 all partial, and claim 6 complete

Circular permuted avidin monomer being cpAvd6to5, isolated polynucleotides encoding said monomer, recombinant vectors comprising said polynucleotide and host cells comprising said vectors. Method of producing the monomer.  
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4. claims: 1-4, 8-10, 15, 16, 22-25 all partial, and claim 7 complete

Circular permuted avidin monomer being cpAvd4to3, isolated polynucleotides encoding said monomer, recombinant vectors comprising said polynucleotide and host cells comprising said vectors. Method of producing the monomer.  
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5. claims: 11-14, 17-21 all completely, claims 22-25 all partially

Dual chain avidins being a fusion of two avidin monomers chosen from cpAvd5to4, cpAvd6to5, or cpAvd4to3, or the mutants thereof. Combinations of two double chain avidins fused into one single chain avidin. Isolated polynucleotides encoding said polypeptide, recombinant vectors comprising said polynucleotide and host cells comprising said vectors. Method of producing the polypeptides.  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/FI2004/000679

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|----|---------------------|----------------------------|---------------------|
| US 6492492                                | B1 | 10-12-2002          | AU 3380099 A               | 25-10-1999          |
|   |    |                     | CA 2324205 A1              | 14-10-1999          |
|   |    |                     | EP 1066322 A1              | 10-01-2001          |
|   |    |                     | JP 2002510707 T            | 09-04-2002          |
|   |    |                     | WO 9951632 A1              | 14-10-1999          |